Work Order ID 85877

July-06-12 10:25:18 AM

85877

Item ID: D212-664-107 **Accept** *N900040100* **Setup Start** *NS1*

Revision ID: **Stop** *NS2*

Item Name: Crosstube Low Standard Fwd

Start Date: 6/18/12 **Start Qty:** 1.00 *1*

Required Date: 7/02/12 **Req'd Qty:** 1.00 *1*

Reference:

Cust Item ID:

Customer:

Approvals: **Process Plan:** N **Date:** **Tooling:** **Date:**

QC: **Date:** **SPC (Y/N):** **Date:**

Run Start *NR1*

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp

Draw Nbr	Revision Nbr
D212-664-147	Rev B (DEO)

100 0.00

100

DC DOCUMENT CONTROL

Document Control

Memo 0.00

Photocopy bluefile and create labels as per PPP D212-664-107
D6019-128 (ID = 2.125") = CHG 002

DAS 16 8-89 12/05/12

MCJ 12/06/02

110 0.00

110

Packaging Packaging

Packaging

Memo 0.00

Rm 12-7-10

120 0.00

120

CNC Bend 2 BENDING MACHINE - CROSSTUBES

CNC Alpha 160 Bender

Memo 0.00

Bend tube as per Dwg D212-664-107 using CNC bender program 212-107

MD/Rm 12-7-10

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item ID: D212-664-107 **Accept** *N900040100* **Setup Start** *NS1*
Revision ID: **Stop** *NS2*
Item Name: Crosstube Low Standard Fwd
Start Date: 6/18/12 **Start Qty:** 1.00 *1*
Required Date: 7/02/12 **Req'd Qty:** 1.00 *1*
Reference:
Cust Item ID:
Customer:

Run Start *NR1*
Stop *NR2*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00							
130		0.00 5/12/10				(4)			
QC	**Memo**								
Quality Control									
140		0.00							
140	Crosstubes								
Crosstubes	**Memo**	0.00							
Crosstubes	1-Cut tube as per inspection dwg and deburr ends. ***ensure saw is square***								
	2-Position cuffs on tube ensure proper positioning								
	3-Drill tube as per dwg using DT8577 location #7 & # 212 ULF using jig DT8548 and DT8549 as per QSI 10								
	4-Transfer drill rivet holes from cuff into tube.								
	5-Identify cuff position and Batch # on each and identify tube as per dwg D212-664-107.					JW		12-7-10	
	6- *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Inspect surface damage					MO		12-7-11	
	7- Deburr and realodine cuff.								

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Work Order ID 85877

July-06-12 10:25:18 AM

85877

Item ID: D212-664-107 **Accept** *N900040100* **Setup Start** *NS1*

Revision ID: **Stop** *NS2*

Item Name: Crosstube Low Standard Fwd

Start Date: 6/18/12 **Start Qty:** 1.00 *1*

Required Date: 7/02/12 **Req'd Qty:** 1.00 *1*

Reference:

Cust Item ID:

Customer:

Run Start *NR1*

Stop *NR2*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	QC5	0.00							
150		0.00							
QC	Memo								
Quality Control									
160		0.00							
160						AB	12-7-20		
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1- CLEAN CROSSTUBE WITH WASH'N WIPE								
180	Outsource process - NDT per QSI038 4.1	0.00							
180						CZ	12/07/11	(1)	
Outsource2	Memo	0.00							
Outsource process - NDT	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Liquid Penetrant Inspection as per QSI 038Or Issue P/O: 17428 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
	17504					CZ	12/07/20	(1)	

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item ID: D212-664-107 **Accept** *N900040100* **Setup Start** *NS1*
Revision ID: **Stop** *NS2*
Item Name: Crosstube Low Standard Fwd
Start Date: 6/18/12 **Start Qty:** 1.00 *1* **Cust Item ID:**
Required Date: 7/02/12 **Req'd Qty:** 1.00 *1* **Customer:**
Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** *NR1*
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop** *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190		0.00							
190	Packaging								
Packaging	**Memo**	0.00							
Packaging	Ensure copy of NDT results attached to work order.								
									12/7/13
200	QC5- Inspect part completeness to step on W/O	0.00							
200									
QC	**Memo**	0.00							
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Inspect for damage & ensure results are as per Dwg D212-664-107								12/7/20
202		0.00							
202									
HandFXtube	**Memo**	0.00							
Hand Finishing Crosstubes	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1- PRESSURE WASH AND THEN USE WASHH'N WIPE TO CLEAN CROSSTUBE BEFORE CHEMICAL CONVERSION								AJ 12-7-20

Dart Aerospace Ltd

W/O: 85877	WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: D212-664-107 **PAR #:** _____ **Fault Category:** Machining X Tube **NCR:** (Yes) No **DQA:** [illegible] **Date:** 12/08/13

Resolution: _____ **Disposition:** Rework **QA: N/C Closed:** [illegible] **Date:** 12/08/14

NCR: 12-1663	WORK ORDER NON-CONFORMANCE (NCR)							
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B: **Initial** Chief Eng	**Action Description** Chief Eng	**Sign & Date**	**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
12.07.24	200	FROM MACHINING TRANSITION MARK VISIBLE. THIS MARK IS TYPICAL, HOWEVER IT IS USUALLY BUFFED OUT. LOCATED IN MIDDLE OF R35.5 BEND.	DAS 12 8-89 12.7.24	THE MARK WAS SMOOTH AND BARELY VISIBLE. PERFORM ADDITIONAL BUFFING IN AFFECTED AREA. ENSURE THERE ARE NO CIRCUMFERENTIAL MARKS.	JW 12-08-02	DAS 16 8-89 12/08/02	DAS 12 8-89 12.7.24	DAS 8-89 12/08/02
		↓	DAS 12 8-89	RE-NDT AFTER BUFFING		DAS 15 8-89 12/08/02	DAS 12 8-89	12/08/02

NOTE: Date & initial all entries

Item ID: D212-664-107 **Accept** *N900040100* **Setup Start** *NS1*
Revision ID: **Stop** *NS2*
Item Name: Crosstube Low Standard Fwd
Start Date: 6/18/12 **Start Qty:** 1.00 *1* **Cust Item ID:**
Required Date: 7/02/12 **Req'd Qty:** 1.00 *1* **Customer:**
Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** *NR1*
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop** *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
205	QC7-Inspect Chemical Conversion Coat	0.00							
205									
QC	**Memo**	0.00							
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	DAS 16 8-89 12/07/24								
210		0.00							
210	Crosstubes					AB	12-7-24		
Crosstubes	**Memo**	0.00							
Crosstubes	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff								
	A/R SIKAFLEX -241/-291 BATCH: 122130								
215	QC5- Inspect part completeness to step on W/O	0.00							
215									
QC	**Memo**	0.00							
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	DAS 16 8-89 12/07/24								

Dart Aerospace Ltd

W/O: 85877		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: D212-664-107 **PAR #:** _____ **Fault Category:** Landing Gear / x-tube Assembly **NCR:** (Yes) No **DQA:** [illegible] **Date:** 12/08/13

Resolution: _____ **Disposition:** Rework **QA: N/C Closed:** AD **Date:** 12/08/14

NCR: 12-11664		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			
12/07/30	4	Found before forming a small notch / nick in the tube on the inside Bend about 38.375" from c/l. R.C. mis handling of tubes	MP 12/7/30	Accurate to buff out "nick" as per Small Part DS. 10 30th July 2012.	KM 12-7-30		MP 12/7/30	DAS 16 12/07/30
				Clean with Acid & Re touch up Blending as per ASI005	KM 12-7-30			DAS 16 12/07/30

NOTE: Date & initial all entries

Eric Downing

From: David Shepherd <dshepherd@dartaero.com>
Sent: Monday, July 30, 2012 3:03 PM
To: 'Mike Petsche'; 'Eric Downing'; 'Alex Pharand'
Cc: 'L Lacelle'; psmith@dartaero.com; Isam el Kassis; 'Bill Beckett'
Subject: RE: nick on D212-664-107

Mike,

Thanks for the clearer photo.

Eric,

It is acceptable to buff out this damage on the basis that:

a) It is within the allowable damage limits of our ICA
b) It is for a low gear fwd crosstube
c) Damage is outside supports and near the neutral axis

Since the alodine coating will be compromised, does this mean that we would etch and re-alodine the entire tube to have a continuous alodine coating.

Isam & Bill,

FYI.

David

From: Mike Petsche [mailto:mpetsche@dartaero.com]
Sent: July-30-12 9:00 AM
To: 'David Shepherd'; 'Eric Downing'; 'Alex Pharand'
Cc: 'L Lacelle'; psmith@dartaero.com
Subject: RE: nick on D212-664-107

It's about 17.5" (ish) off BL 0.

Better photo attached. You can see where it's raised on the RH side

---

From: David Shepherd [mailto:dshepherd@dartaero.com]
Sent: Monday, July 30, 2012 10:51 AM
To: 'Eric Downing'; 'Alex Pharand'
Cc: 'L Lacelle'; psmith@dartaero.com; 'Mike Petsche'
Subject: RE: nick on D212-664-107

How far is it from BL 0?
Can you send a better photo of the defect?

Thanks,
David

From: Eric Downing [mailto:edowning@dartaero.com]
Sent: July-30-12 5:36 AM
To: David Shepherd; Alex Pharand
Cc: 'L Lacelle'; psmith@dartaero.com; 'Mike Petsche'
Subject: nick on D212-664-107

Good morning David

As you can see from the time I just walked in to be told of a small "nick" in a C212-664-107 cross tube. The nick appears to be about 0.012" deep and about 0.065" in width. From looking at it I would guess that it was damaged when moving tubes to pain NDT inspection and alodine. The "nick" happened after the alodine process as you can see in the pictures attached.

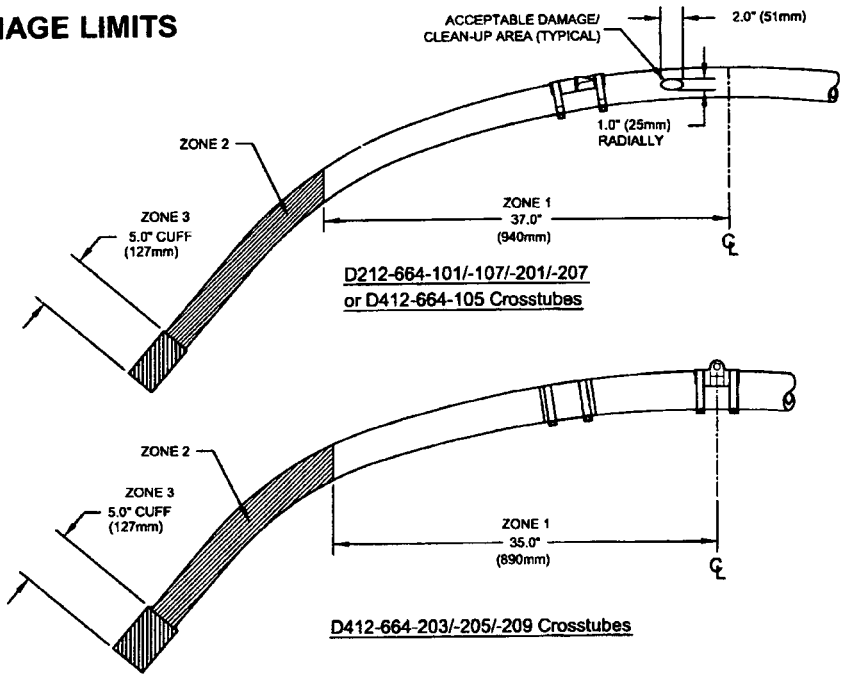
Now my questions are is it acceptable to buff this "nick" out ad for the alodine process how should we proceed? Can we buff out mark clean area with acid wash and apply alodine?

What do you think David I don't the ability to approve any reworks like this.

Thanks

Eric Downing
QC Corrdinator
Dart Aerospace LTD

5.2 DAMAGE LIMITS



Maximum Nick, Scratch, or Corrosion Damage Depth Limit			
Damage Zone	**3**	**2**	**1**
D212-664-101/-107 High/Std. Fwd Crosstube	0.030" (0.76mm)	0.012" (0.30mm)	0.015" (0.38mm)
D412-664-105 Low-Narrow Fwd Crosstube	0.030" (0.76mm)	0.015" (0.38mm)	0.015" (0.38mm)
D212-664-201/-207 High/Std. Aft Crosstube	0.038" (0.97mm)	0.015" (0.38mm)	0.015" (0.38mm)
D412-664-203/-209 High/Std. Aft Crosstube	0.038" (0.97mm)	0.012" (0.30mm)	0.015" (0.38mm)
D412-664-205 Low-Narrow Aft Crosstube	0.038" (0.97mm)	0.015" (0.38mm)	0.015" (0.38mm)

Figure 5-2: *Acceptable Crosstube Damage Limits*

5.3 300 HOUR INSPECTION

To be performed every 300 hours or if damage found on daily inspection.

Note: For the convenience of scheduling maintenance, the tolerance for scheduled inspection intervals is +/-10% (+/- 30 hours). In each case, the subsequent interval will be adjusted to re-establish the original schedule. When an inspection is done more than 10% early, subsequent inspections will be advanced as required not to exceed the maximum tolerance. Concurrence and final approval of inspection interval tolerance by the governing civil aviation authority is the responsibility of the owner/operator.

5.3.1 Inspect all visible areas of the crosstube for cracks. The bottom side of the crosstube should be inspected for cracks using a 10X magnifying glass with weight on the landing gear. If a pattern is observed that resembles the crack pattern shown in Figure 5-3 below, an LPI inspection should be performed as outlined in section 5.5. Cracks in the crosstube are

Item ID: D212-664-107 **Accept** *N900040100* **Setup Start** *NS1*
Revision ID: **Stop** *NS2*
Item Name: Crosstube Low Standard Fwd
Start Date: 6/18/12 **Start Qty:** 1.00 *1* **Cust Item ID:**
Required Date: 7/02/12 **Req'd Qty:** 1 00 *1* **Customer:**
Reference:

Run Start *NR1*
Stop *NR2*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
220		0.00							
220	SprayPaint					1			12.07.31
SprayPaint	**Memo**	0.00							
Spray Painting	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1-Prime inside and outside crosstube as per QSI 005 4.2								
	2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME: Start Time: 8:00 Fininsh Time: 9:00								
	PAINT: Start Time: 1:00 Finish Time: 2:00								
230	QC14- Inspect Spray Paint	0.00							
230						1			12.08.01
QC	**Memo**	0.00							
Quality Control	Wrap in plastic bag to protect from scratches								

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item ID: D212-664-107 **Accept** *N900040100* **Setup Start** *NS1*
Revision ID: **Stop** *NS2*
Item Name: Crosstube Low Standard Fwd

Start Date: 6/18/12 **Start Qty:** 1.00 *1* **Cust Item ID:**
Required Date: 7/02/12 **Req'd Qty:** 1.00 *1* **Customer:**
Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** *NR1*
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop** *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240		0.00							
240	Crosstubes					1		W/ 120801	
Crosstubes	**Memo**	0.00							
Crosstubes	1- Assemble as per Dwg D212-664-147 1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe 2-Install supports with Proseal 890 per DSI9563 and QSI 015 A/R Proseal 890 Batch: 12241 3- Torque bolts as per dwg								
250	QC5- Inspect part completeness to step on W/O	0.00							
250									
QC	**Memo**	0.00							
Quality Control									

DAS 16 8-89 7/05/12

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item ID: D212-664-107 **Accept** *N900040100* **Setup Start** *NS1*
Revision ID: **Stop** *NS2*
Item Name: Crosstube Low Standard Fwd

Start Date: 6/18/12 **Start Qty:** 1.00 *1* **Cust Item ID:**
Required Date: 7/02/12 **Req'd Qty:** 1.00 *1* **Customer:**
Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** *NR1*
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop** *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
255	Pick Kit	0.00					6/21/12		
255									
Packaging	**Memo**	0.00							
Packaging									
260	QC4- 100% Inspect kits for completeness	0.00							
260			DAS 16 8-89						
QC	**Memo**	0.00	closed						
Quality Control									
270		0.00							
270	Packaging						12/3/25		
Packaging	**Memo**	0.00							
Packaging	Identify and pack for shipping as per PPP D212-664-107								

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item ID: D212-664-107 **Accept** *N900040100* **Setup Start** *NS1*
Revision ID: **Stop** *NS2*
Item Name: Crosstube Low Standard Fwd
Start Date: 6/18/12 **Start Qty:** 1.00 *1* **Cust Item ID:**
Required Date: 7/02/12 **Req'd Qty:** 1.00 *1* **Customer:**
Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** *NR1*
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop** *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
280	QC21- Final Inspection - Work Order Release	0.00							
280									
QC	**Memo**	0.00				____	MJ 12/08/02		
Quality Control									

12/20/02

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Picklist Print

June-18-12 10:46:08 AM

4

Work Order ID: 85877 *85877*

Parent Item: D212-664-107 *D212-664-107*

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 18/06/2012 **Required Date:** 02/07/2012

Start Qty: 1.00 **Required Qty:** 1.00

Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM
IPP Rev:B ECN 1100 08-01-11 DD verified by: EC
IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec IPP Rev:D
10.05.27 added pick kit DD verf:EC IPP Rev:E 11.10.17
added SEQ 215 DD verf:EC IPP REV:F 11.11.03 as per
chg003 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-107TRN		Manufactured	No	B80053		140	Each	0.0000	1	(1)			
D212-664-107TRN									**		RM	12-7-10	
Crosstube Turning Detail													
D3659-1		Manufactured	No			220	Each	9.0000	2	2			
D3659-1									**				
CUFF													

Location	Loc Qty	Loc Code
ST482	9	
67005	1	
75173	1	
(77032)	7	

CR3212-4-06		Purchased	No			240	Each	202.0000	44	44			
CR3212-4-06									**			JW 12-7-10	
CHERRY RIVET										(44)		AR 12-7-24	

122378

Location	Loc Qty	Loc Code
ST330	149	
120521	149	
ST331	53	
112492	18	
112794	8	
119717	27	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Picklist Print

June-18-12 10:46:08 AM

Work Order ID: 85877

85877

Parent Item: D212-664-107

D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 18/06/2012 **Required Date:** 02/07/2012

Start Qty: 1.00 **Required Qty:** 1.00

D3595-063-450	Manufactured	No	240	Each	155.8095	4	4

D3595-063-450

RUBBER CUSHION

**

W(12·08·01

Location	Loc Qty	Loc Code	
LG	36		
82511	36		
LG051	109.7		
80161	1.7		
84715	108		
MAT052	10.109474		
67353	2		
68893	6		
70113	0.56		
71354	0.2		
74113	0.349474		
75597	1		

MS21920-25	Purchased	No	240	Each	107.0000	4	4

MS21920-25

Clamp(per MIL-DTL-8783C)

**

AH 12-8-2

Location	Loc Qty	Loc Code	
LG050	67		
116264	2		
117998	4		
118142	4		
119339	2		
119746	2		
120475	7		
120920	46		
LG051	40		
121583	40		

BT#122204

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Picklist Print

June-18-12 10:46:08 AM

Work Order ID: 85877 *85877*

Parent Item: D212-664-107 *D212-664-107*

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 18/06/2012 **Required Date:** 02/07/2012

Start Qty: 1.00 **Required Qty:** 1.00

D2893-1	Manufactured	No		240	Each	25.0000	2	2

D2893-1
2.75 Support

Location	Loc Qty	Loc Code
LG	9	
83056	9	
LG052	16	
72865	2	
80271	13	
82228	1	

D3428-1	Manufactured	No		260	Each	39.0000	1	1

D3428-1
Placard

Location	Loc Qty	Loc Code
ST042	39	
78933	2	
81881	15	
83582	10	
85228	12	

AN6-35A	Purchased	No		260	Each	58.0000	4	4

AN6-35A
BOLT

Location	Loc Qty	Loc Code
342	50	
121181	50	
ST342	8	
120187	8	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

Picklist Print

June-18-12 10:46:08 AM

Work Order ID: 85877 *85877*

Parent Item: D212-664-107 *D212-664-107*

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 18/06/2012 **Required Date:** 02/07/2012

Start Qty: 1.00 **Required Qty:** 1.00

AN6-36A		Purchased	No		260	Each	68.0000	4

AN6-36A

Bolt

M122416 sf

Location	Loc Qty	Loc Code
ST342	68	
118422	2	
119449	1	
120187	4	
120423	61	

MS21042L6		Purchased	No		260	Each	598.0000	6

MS21042L6

Nut

Location	Loc Qty	Loc Code
ST300	598	
117677	25	
118384	3	
118927	48	
119075	322	
120308	200	

AN960JD616	NAS1149D0663J	Purchased	No		260	Each	0.0000	18

AN960JD616

Washer

M121243 M22452 12/8/0

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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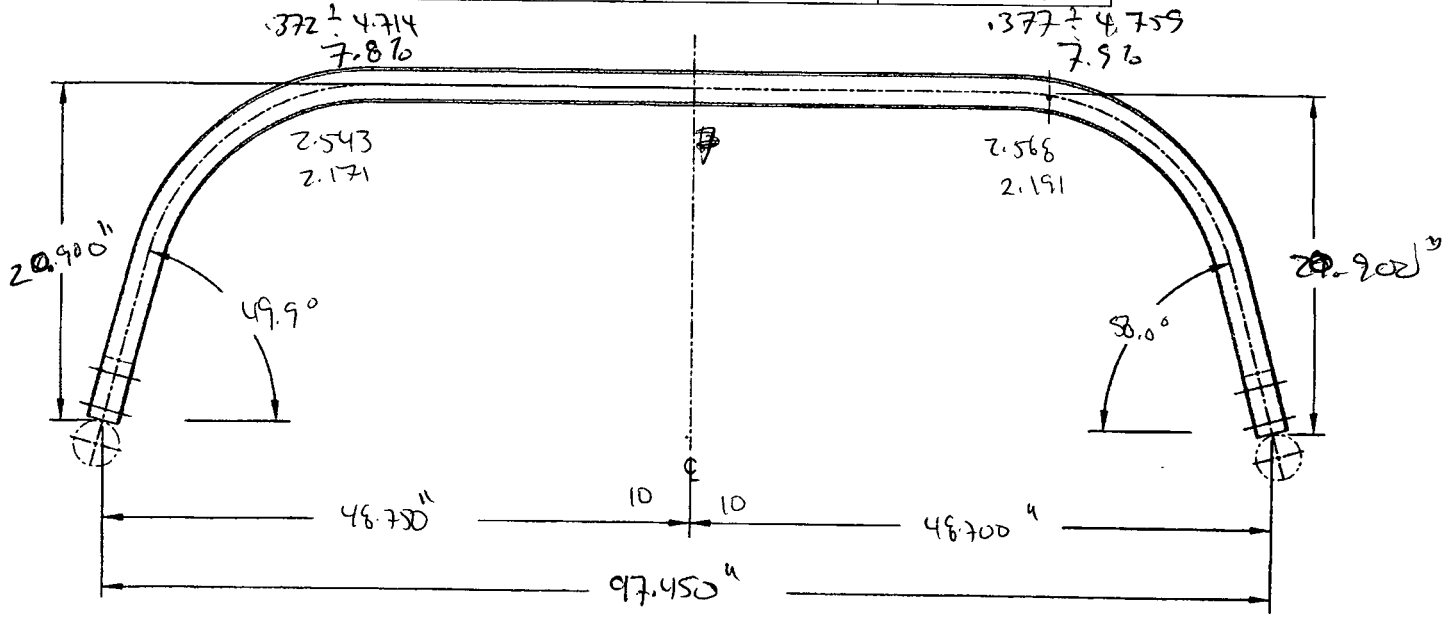
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	25877
Description: Crosstube Low Fwd (205/212/412)	**Part Number:**	D212-664-107
Inspection Dwg: D212-664-147 **Rev:** B		Page 1 of 1

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62
Bending Passes	8	--
Crushing	--	6% / 10%



	Side A	Side B
Bending Passes	(10)	(10)
Crushing	7.8%	7.9%
Comments		
Side A = 10 passes.		
~~Side B = MIDDLE = 7 passes.~~		
Side B = 10 passes.		
Mark line at Bottom of Lower.		

QC15 Inspection	
Date	12/07/10

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	
B	10.01.21	Dwg Rev updated	KJ	
C	12.04.16	Added bending, crushing dimensions	KJ	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

1) MATERIAL MANUFACTURED FROM D6019-128
   FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
   PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
   PAINT OUTSIDE PER DART QSI 005 4.2
3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
4) UNITS: INCHES UNLESS OTHERWISE NOTED
5) BREAK SHARP EDGES. 0.005 TO 0.010 MAX
6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
7) WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)
   D212-664-147B = 24.2 lbs (PER IIN-D212-664)
8) PART IS SYMMETRIC ABOUT CENTERLINE.
9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH
10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038
12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING
16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS
17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 85877 MLJ
12/06/18

DEO ATTACHED

PER ECN #11.6 H
& 11.07.28
UNDER REVIEW
11.06.13

RELEASED
2009 -10- 29

REV.	DESCRIPTION	BY	DATE
B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS; ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07

DESIGN		DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED		DRAWING NO.	REV. B
MFG. APPR.		D212-664-147	SHEET 1 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30		

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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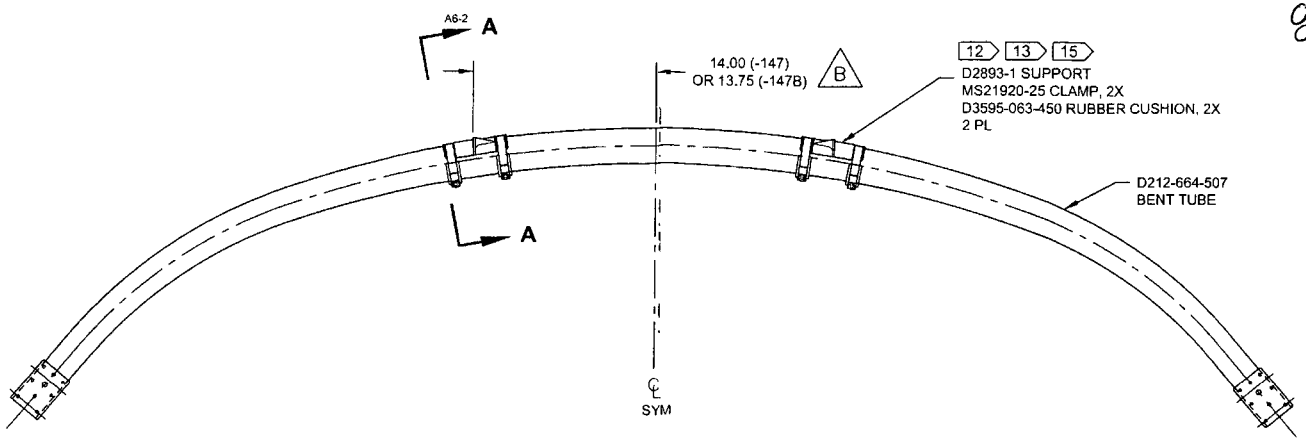
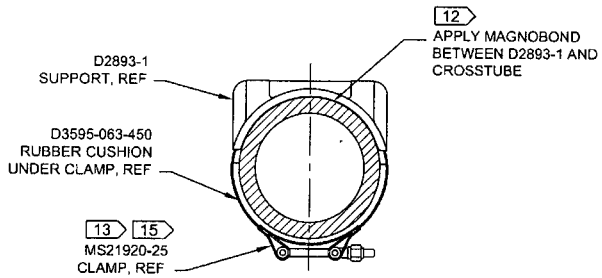
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries



D212-664-147/-147B
ASSEMBLY DETAIL B



SECTION A-A D5-2
SCALE 4X

DEO ATTACHED

ECN#11-614
BK.07.29
UNDER REVIEW
09.11.06.13

RELEASED
2009 -10- 29

DESIGN		DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. B
MFG. APPR.		D212-664-147	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30		

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

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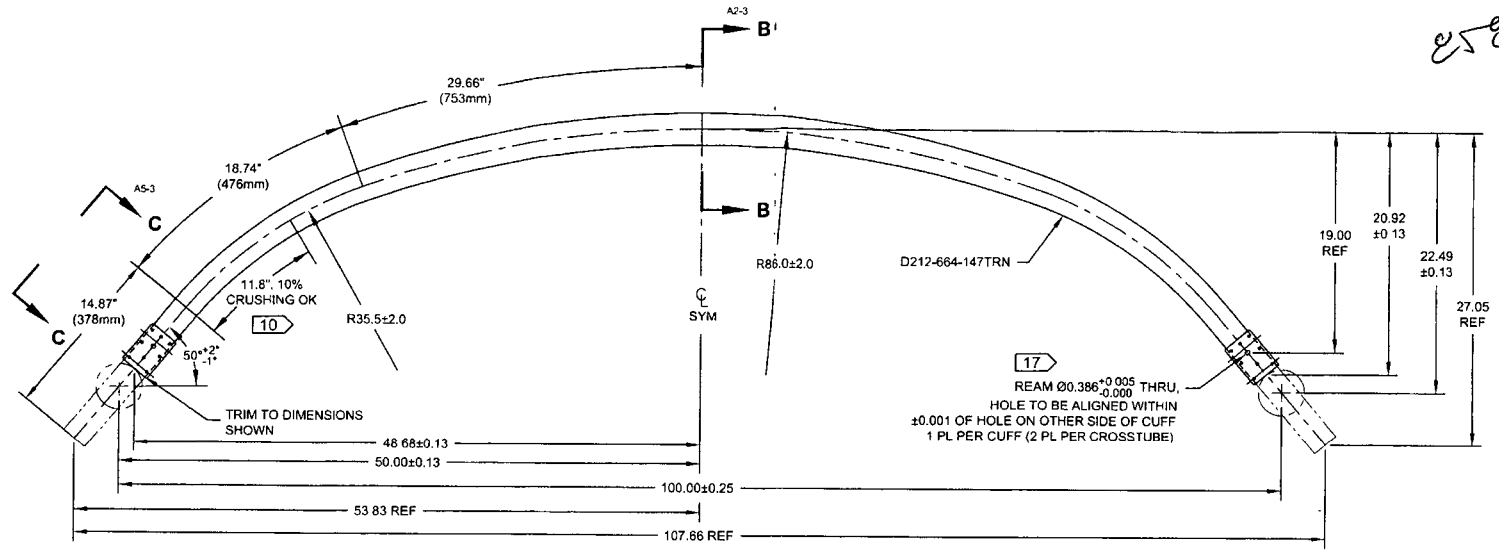
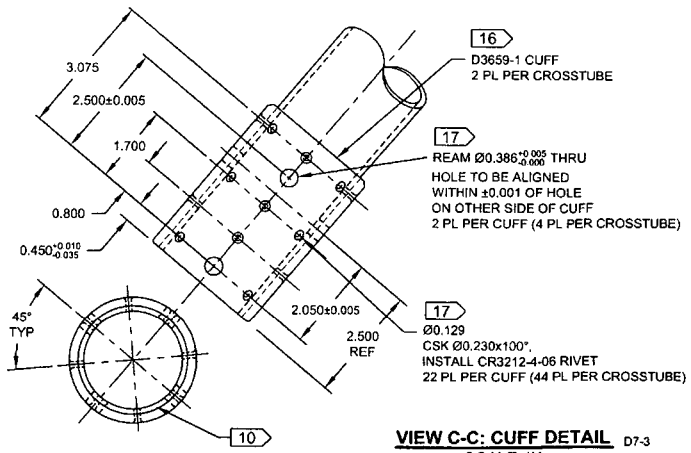
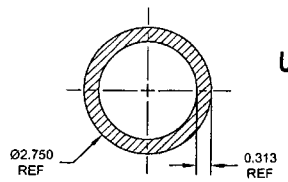


D212-664-507
BENDING AND DRILLING DETAIL 10 B



VIEW C-C: CUFF DETAIL D7-3
SCALE 4X



SECTION B-B D5-3
SCALE 4X

DEO ATTACHED

DCN#11-614
SK.09.28

UNDER REVIEW
9 11.04.13

RELEASED
2009 -10- 29

DESIGN		DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. B
MFG. APPR.		D212-664-147	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30		

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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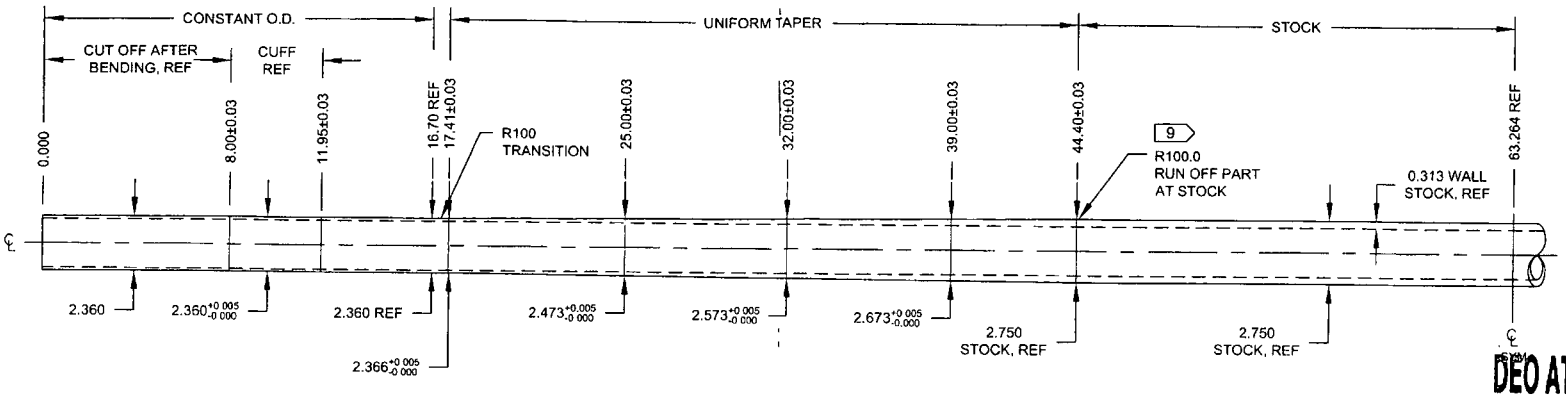
NOTE: Date & initial all entries

25877



D212-664-147TRN
TURNING DETAIL

DEO ATTACHED

ECO #11-614
11.07.28

UNDER REVIEW

RELEASED
2009-10-29

DESIGN		DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. B
MFG. APPR.		D212-664-147	SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30		

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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NOTE: Date & initial all entries

DRAWING NO.	TITLE	REV. B	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D212-664-147	CROSSTUBE ASS'Y (205 LOW FWD)		ENGINEERING ORDER	D212-664-147-B-1	SHEET 1 OF 1	NTS

DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21	DATE 11.07.21

PURPOSE:
REPLACE MAGNOBOND WITH PROSEAL.

85877

CHANGE:

IS:

Item	Qty -147	Qty -147B	Part Number	Description
9	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

12) TO INSTALL D2893-1 SUPPORT: ABRADE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.

15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.

15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED 2011-07-28

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

LIQUID PENETRANT TEST REPORT

P- 10159

ACUREN

PAGE 1 OF 1

CLIENT: DART AEROSPACE — DATE: July-12-2012 TIME: AM ☐ PM ☐

ATTENTION: LINDA / CHANTALE — ACUREN JOB NO.: 188-12-C0220

ADDRESS: 1270, A Beideen ST. HAWKESBURY, ON — PO/WO NO.:

WORK LOCATION: AS ADDRESS

ACCEPTANCE STD.: ASTM E1417 STD REV./DATE: 2005

PROJECT: LPI WET Fluorescent on 4 CROSS-TUBES

ITEM(S) EXAMINED: 100% of EXTERNAL SURFACE on 4 "CROSS TUBES"

JOB DESCRIPTION | PROCEDURE NO. LT-002 REV./DATE 2009 | TECHNIQUE NO. LT-002 REV./DATE 2009

PART NO. — MATERIAL Aluminum — THICKNESS N/A

SCOPE: Performed a wet flour. LPI on 100% of the EXTERNAL SURFACE on ITEMS MENTIONED

TEST DETAILS

METHOD	☑ FLUORESCENT	☐ VISIBLE		☐ WATER WASH	☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND	MAGNAFLUX			BLACK LIGHT S/N 13798	☑ OUTPUT > 1000 µ W/CM² ☐ AMBIENT < 2 fc
PENETRANT	ZL-67	MINIMUM DWELL TIME	45 MIN.	LIGHTING EQUIP.	☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT>100 fc @ SURFACE
PENETRANT REMOVER	H2O	MINIMUM DRY TIME	>10 MIN.	OTHER	
DEVELOPER	SKD-S2	MINIMUM DWELL TIME	30 MIN.	LIGHT METER S/N	1098866 CAL DUE DATE OCT-28-2012
DEVELOPER TYPE	☑ NON AQUEOUS ☐ AQUEOUS	☐ DRY			

TEST SURFACE

SURFACE CONDITION	☐ AS GROUND	☐ AS WELDED	☐ MACHINED	☐ SHOT BLASTED	☑ CLEAN BARE METAL
SURFACE TEMPERATURE	☐ < - 4°C/ 20°F	☐ - 4°C/ 20°F TO 10°C/50°F		☑ 10°C/50°F TO 52°C/125°F	☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

1	CROSSTUBE FWD WO ID 86228 ✓	ITEM ID D212-664-101
2	" FWD WO ID 86227 ✓	ITEM ID D212-664-101
3	CROSSTUBE AFT STD FWD WO ID 85876 ✓	ITEM ID D212-664-107
4	" " " " WO ID 85877	ITEM ID D212-664-107

NO RELEVANT INDICATION WAS DETECTED AS PER APPLICABLE STANDARD

SIGNATURES

CLIENT REPRESENTATIVE: Ian Tilley (PRINT) — (SIGNATURE)

TECHNICIAN (SIGNATURE): — (SIGNATURE)

NAME (PRINT): VGS DESPOMER (1ST TECHNICIAN) — (2ND TECHNICIAN)

	1ST TECHNICIAN	2ND TECHNICIAN
CGSB LEVEL	2	—
SNT LEVEL	2	—
CGSB REG. NO	3044	—

DTR # 685111

REPORT REVIEWED BY:

NAME	INITIALS

WHITE – CLIENT COPY CANARY – OFFICE COPY PINK – TECHNICIAN COPY GOLD – OFFICE COPY

ACUREN

LIQUID PENETRANT TEST REPORT

P- 12202

PAGE 1 OF 1

CLIENT: DAT AERO SPACE
ATTENTION: ANDY / LINDA
ADDRESS: 1270 ABERDEEN ST. HAWKESBURY, ON
DATE: Jul 20/12 TIME: AM ☑ PM ☐
ACUREN JOB NO.: 188-12-00285
PO/WO NO.: —
WORK LOCATION: SAME -038
ACCEPTANCE STD.: ASTM 1417/05 REV./DATE: 2005
PROJECT: F.P.I. on CROSS TUBES
ITEM(S) EXAMINED: — " — PCS

JOB DESCRIPTION	PROCEDURE NO. LT-002 REV./DATE 2008	TECHNIQUE NO. LT-1/2/3 REV./DATE 2008

PART NO.: SEE RESULTS MATERIAL: ALUMINUM THICKNESS: VARIOUS

SCOPE: A WET FLUORESCENT LIQUID PENETRANT EXAMINATION WAS COMPLETED ON THE EXTERNAL SURFACE 100%

TEST DETAILS

METHOD	☑ FLUORESCENT ☐ VISIBLE			☑ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED	
FAMILY BRAND	MAGNAFLUX			BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000 µW/CM² ☐ AMBIENT < 2 fc	
PENETRANT	2467	MINIMUM DWELL TIME	5 10 MIN.	LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT>100 fc @ SURFACE	
PENETRANT REMOVER	H2O	MINIMUM DRY TIME	>10 MIN.	OTHER LABINO	
DEVELOPER	SKD S2	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N 1098866	CAL DUE DATE Jul 17/12
DEVELOPER TYPE	☑ NON AQUEOUS ☐ AQUEOUS	☐ DRY			

TEST SURFACE

SURFACE CONDITION	☐ AS GROUND	☐ AS WELDED	☑ MACHINED	☐ SHOT BLASTED	☑ CLEAN BARE METAL
SURFACE TEMPERATURE	☐ < -4°C/ 20°F	☐ -4°C/ 20°F TO 10°C/50°F		☑ 10°C/50°F TO 52°C/125°F	☐ > 52°C/125°F

RESULTS- (☑ METRIC ☐ IMPERIAL)

CROSS TUBE W.O. 85877

1	"	"	85877	✓
1	"	"	86693	✓
1	"	"	86692	✓
1	"	"	84764	✓
1	"	"	86932	✓
1	"	"	87329	✓
1	"	"	87328	✓
1	"	"	85315	✓
1	"	"	85316	✓
1	"	"	85317	✓
1	"	"	85318	✓

ENGINEERING REQUEST - NCR WAS ORIGINALLY NDT ON Jul 17/12 Report P-10159.

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of its data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE: Andy Sheldon (PRINT) — (SIGNATURE)

TECHNICIAN (SIGNATURE):

NAME (PRINT): Mike Thurston (1ST TECHNICIAN) — (2ND TECHNICIAN)

CGSB LEVEL 2 SNT LEVEL — CGSB REG. NO 6606 — CGSB LEVEL — SNT LEVEL — CGSB REG. NO

DTR # E117389

REPORT REVIEWED BY:

NAME — INITIALS

WHITE – CLIENT COPY CANARY – OFFICE COPY PINK – TECHNICIAN COPY GOLD – OFFICE COPY

5.2 STANDARD GEAR CROSSTUBES

Item	-107	-207	-209	Part Number	Description
	X			**D212-664-107**	**CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD**
		X		**D212-664-207**	**CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT**
			X	**D412-664-209**	**CROSSTUBE INSTALLATION, 412 STANDARD AFT**
6	1			D212-664-147	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
7		1		D212-664-247	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
8			1	D412-664-249	CROSSTUBE ASSEMBLY, 412 STANDARD AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
45	2			* D3659-1	CUFF
46		2	2	* D3660-1	CUFF
47	44	44		* CR3212-4-06	RIVET (M7885/3-4-06)
48			44	* CR3212-4-07	RIVET (M7885/3-4-07)
50	1	1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-147/-247 OR D412-664-249 ASSEMBLIES ABOVE

NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AAI SKIDTUBES.